

Commonwealth of Kentucky
Division for Air Quality
EXECUTIVE SUMMARY

TITLE V REVISION (FINAL PERMIT) NO. V-05-089R2

MARATHON PETROLEUM COMPANY, LLC

CATLETTSBURG REFINING, LLC

P.O. Box 1492

CATLETTSBURG, KY

DATE: JANUARY 10, 2009

SUKHENDU K MAJUMDAR, REVIEWER

SOURCE I.D. #21-019-00004

SOURCE AI # 339

ACTIVITY # APE20080006/20080007/20080008/20080010/20080011/20080015

REVISION: V-05-089 R2:

A significant revision application to increase the processing rate of Kerosene Desulfurization Unit (KDS) was received by the Division on May 5, 2008. The KDS unit started operation in March 2006 under the operating permit VF-04-001. The permit conditions were later subsumed into Title V permit V-05-089. The unit was originally permitted for a heater heat input capacity of 53.3 mmBtu/hr Higher Heating Value (HHV) and a nominal capacity of 25,000 barrel/day kerosene throughput. The facility has determined that the unit can be operated as built at 34,000 barrel/day and 65 mmBtu/hr HHV. Pursuant to 401 KAR 51:017 (16)(4) and 401 KAR 51:052 (7)(4), the change in processing rate would be a significant revision of the permit due to the change in existing heater duty and heater emission limits imposed in V-05-089 permit. Because the increase in heat input rate for the KDS unit will be achieved solely through the relaxation of the permit conditions with no physical change, the project was revaluated at the requested higher rates, as if construction had never commenced. From this analysis, the construction of the KDS Unit did not result in a net significant emissions increase pursuant to 401 KAR 51:017 or 401 KAR 51:052, based on the new heater input capacity and kerosene throughput.

A significant revision application to modify and expand the Sulfolane Unit and construction of a barge loading vapor destruction unit (VDU) at the Light Oil Barge Loading Dock was received by the Division on August 19, 2008. Mobile Source Air Toxic (MSAT) Phase 2 rule triggered to modify and expand the Sulfolane Unit to produce 0.62 vol% benzene containing gasoline with averaging, banking and trading beginning January 1, 2011 for refiners. The Sulfolane Unit was designed with a nominal capacity of 25,000 barrels per day and will be expanded to 45,000 barrels per day based on reformat feed. Construction of the project will allow the Catlettsburg Refining, LLC to produce low-benzene containing gasoline as required by US EPA's MSAT Phase 2 final rule on February 9, 2007. At the petrochemical area of the refinery, benzene is used as a feedstock to produce cumene. During the periods of Cumene Unit outages, barge loading of unused benzene will be required to maintain optimum processing rates of the two reformers. These loading operations will be governed by 40 CFR 61 Subpart BB and required to have vapor controls. A vapor destruction unit (VDU) with an efficiency greater than 98% will be installed.

Applicability of the PSD regulations 401 KAR 51:017 are not triggered for the MSAT Phase II Sulfolane Unit expansion project because no significant net emissions increase will result. The emissions increase calculations include emissions from new and modified emissions units as well as other affected emissions units upstream and downstream of the new and modified equipment.

A minor permit revision application was received by the Division on June 16, 2008 for the corrections of a few text inaccuracies and a few other corrections to the permit V-05-089 R1. These corrections of text inaccuracies and other corrections are incorporated in the significant revision permit V-05-089 R2.

A minor permit revision application was received by the Division on July 7, 2008 for the revision of the synthetic minor limits to the Boiler Consolidation project. To ensure consistency with the consent decree entered into by CRLLC and the U.S. EPA, CRLLC requested to revise the permit to include a cap on SO₂ emissions for the three new boilers. The revision to include SO₂ limits has been incorporated in the revised permit V-05-089 R2.

Additional changes to permit V-05-089 R2 were made to include the minor permit revisions applications received by the Division after the first revision of the initial Title V permit. These changes are as follows:

- Final USA EPA consent decree for Heaters: Minor permit revision for the final consent decree agreement signed on February 7, 2008 between US EPA and the source to limit the emissions from FCC charge heater, Sat Gas heater and HPVGO charge heaters.
- Fuel Gas Drum on-line BTU Analyzer: Minor permit revision to install an on-line fuel gas BTU analyzer in one of the fuel gas drum. The on-line fuel gas analyzer would calculate High Heating Value (HHV) of the fuel gas. The HHV would be used to determine the firing duty of the heaters.

SOURCE DESCRIPTION:

Marathon Petroleum Company at the Catlettsburg Refining, LLC (CRLLC) processes petroleum crude oil to produce gasoline, diesel fuel, kerosene, and jet fuel and petroleum derivatives such as petro-chemicals and lube oil feed stock. Besides the crude oil processing units, the refinery has boilers, sulfur plants, and waste water treatment. Raw crude, refined petroleum products and intermediates are stored in the storage tanks for distribution and further processing.

The refinery at Catlettsburg uses the Big Sandy River to transport domestic crude oil and product distribution in barges. Besides the river transportation, there are railroad tank cars, truck loading, and unloading facilities at different areas of the refinery used for efficient movement of transportation fuels, lube oil feed stock and petrochemicals. Viney Branch transfer racks are provided with a Vapor Recovery Unit (VRU) to absorb volatile organic compounds (VOC) in the activated carbon during loading operation. Activated carbon is regenerated by vacuum by using vacuum pump and the vapor is condensed to recover the hydrocarbon liquid. The vapor recovery system has an absorption and regeneration cycle. VOCs are controlled during solvent loading in the trucks and rail cars by use of the Vapor Destruction Unit (VDU) to reduce the air emissions.

The light gases produced during the processing of the crude oil are used by the refinery sweet fuel gas system after being treated with amines. The refinery fuel gas is used for process heaters, steam generating boilers, flares and incinerators. Amines are regenerated for recycling. Amine regenerator off-gas along with foul water stripper off-gas from the wastewater treatment area, are directed to the sulfur plant. The sulfur plant produces metallic sulfur in the Claus reactors and reduces the sulfur dioxide (SO₂) emission from refinery. Some of the heaters and boilers at the refinery are provided with low nitrogen oxide (NO₂) burners to reduce NO_x emissions to the ambient air.

The refinery has one Fluidized Catalytic Cracking (FCC) unit, two Catalytic Cracking Reformer (CCR) units, and one HF Alkylation unit to produce and improve the Research (RON) and Motor (MON) octane, for the three grades of gasoline distributed in the pumps. The CRLLC has a Lube Oil Complex to produce Lube Feed stock. Lube crude is processed in the #5 crude unit, and the lube vacuum unit makes the 100N and 325N waxy distillate. Waxy distillates are further treated in the Furfural Extraction unit and MEK De-waxing units to produce salable lube feedstock.

The CRLLC also manufactures petrochemicals such as cumene, solvents and other products to be further processed in the chemical industry. Some of the aromatics are also produced in the petrochemical area such as benzene, toluene, xylene, and naphthalene. The refinery brings in Coal Tar Light Oil (CTLO) from the coal industry to meet the demand of benzene in the manufacture of cumene. Light liquid from the reformers and distilled liquids from the CTLO are separated in the Sulfolane Unit liquid-liquid extraction process to produce benzene, toluene and xylene.

The refinery has two independent waste water systems: Oily water sewer system and NESHAP regulated waste water system. The NESHAP water is being collected in collection pits through out the refinery process units and pumped to a storage tank. Water from the storage tank, before going to the common treatment facility, is being treated in the Benzene Recovery Unit (BRU).

U.S. EPA REVIEW:

The U.S. EPA was notified of the issuance of the proposed permit on November 19, 2008 via e-mail. The comment period expired 45 days from the date of e-mail. No comments were received during this period. The permit is now being issued final.